THE PENNY MAGAZINE

OF THE

Society for the Diffusion of Useful Knowledge.

419.] PUBLISHED EVERY SATURDAY. [October 13, 1838.

FOTHERINGAY.

[Fotheringay Church, Northamptonshire.]

The midland counties of England are rich in scenes of historical interest. The events of which the ancient towns of Leicester, Warwick, Coventry, Northampton, Stamford, or Peterboro', have each been the theatre, cannot be touched upon without becoming involved in some of the most important passages of English history. In these towns Parliaments have assembled, at which mailed barons and their armed retainers met in jealousy of the sovereign and often of each other; and before the fusion of all parts into one common body, each possessing similar interests,—when the question, "What do they in the north?" was one on which depended the arming of partisans and friends in the south, east, or west,—opposing factions advanced and met here in the heart of old England, disturbing the labours of its rural population, awing the towns, if their numbers were sufficiently formidable, and exciting the burghers to join their ranks, if the cause were inspiriting and calculated to strike the popular feeling. Of all these by-gone events it is interesting to have some memorial.

The village of Fotheringay, near Oundle, in the north-eastern part of Northamptonshire, is chiefly known as the place where Mary Queen of Scots was executed, after having been a prisoner for the space of eighteen years in a country where she expected to have been received hospitably, at least, if not with the kindly feelings of kinship. The heroic manner in which she prepared for death, and the dignity and firmness she maintained to the last, have been already minutely described in the 'Penny Magazine' (No. 54). To that notice it may not be uninteresting to add some account of e Castle of Fotheringay, where the event took place.

At the period of the Domesday Survey, the Countess Judith held land at "Fodringeia." By the second marriage of her daughter with David, king of Scotland, the manor of Fotheringay came into the possession of the Scottish king, and it was subsequently in the possession of his sons Malcolm and William, who were successively kings of Scotland. The castle had been built about the year 1084, by Simon de St. Liz, a Norman, second Earl of Northampton. In 1212, being then held by David of Scotland, he was required by King John to give it up to the English crown, and refusing to accede to this demand, the sheriff was directed to raise the civil force of the county, and, with the assistance of the townsmen of Northampton, to obtain possession. This object they effected. In 1307 Edward II. granted the castle to the Earl of Richmond. In this reign, a weekly market on Wednesday, and a yearly fair on the eve, day, and morrow of St. Michael, were instituted. The state of the castle in 1340, as ascertained under an inquisition held in that year, is thus described:—It was well built of stone, walled in, embattled, and encompassed with a good moat. Within the castle was one large hall, two chapels, two chambers, a kitchen, and bakehouse, all of stone, with a porter's lodge, having a chamber over it and a drawbridge beneath. The apartments were thus few and inconvenient; but within the castle walls was another place, called the manor, which contained houses and offices, and an outward gate with a

room over it. The area enclosed was altogether about ten acres. The castle, being bounded on the east and south by the Nene, would appear to have been tolerably inaccessible when the wretched state of the roads at that period is taken into account. At this inquisition it was shown that a neighbouring abbey enjoyed a messuage in the village, with some land, on condition of performing service thrice a week for the souls of John Baliol and his ancestors, kings of Scotland, once lords of the castle and manor. About the end of the fourteenth century, the castle, being in a ruinous condition, was repaired and its strength increased by a keep.

During the fifteenth century, Fotheringay Castle belonged to several members of the Plantagenet family. Edward Plantagenet, who died on the field of Agincourt, was buried in the church of Fotheringay. Near him was interred his kinsman, Richard, Duke of York, who in an attempt to raise himself to the throne was killed at the fight at Wakefield, in 1460, along with his third son, Edmund, Earl of Rutland. The funeral ceremonies were conducted with great pomp, and the king and many of the nobility were present. The wife of Richard, a woman of great ambition, survived him thirty-six years, most of which she spent at Fotheringay. She had married in the hope of becoming queen. The death of her husband and son at Wakefield, and of Richard III., also her son (who was born at Fotheringay), at Bosworth, were severe blows to the party of her family. The murders of her grandsons, Edward V. and his brother, were still more appalling instances of the perils with which faction surrounded the claims of royalty. But though not a queen herself, one of her sons, Edward IV., sat upon the throne. It was during the reign of the latter that she gave up to the crown her rights in the manor of Fotheringay; and here Alexander of Scotland promised Edward fealty when he should come to the Scottish throne. Henry VII. gave the manor to his wife, and Henry VIII. settled it upon his first queen. It was held by the crown down to the reign of James I.

In the reign of Henry VIII. the castle was described by Leland as "fair and metely strong, with double ditches, and with a keep very ancient and strong. There be very fair lodgyns in the castell, and, as I heard, Catarine of Spain did great costs of late tymes in refreshing of it." The road towards Oundle, a distance of two miles, he describes as "by mervelus fair corn-ground and pasture, but little wooded."

In the reign of James I., a few years after the execution of the Queen of Scots, his mother, the condition of the castle, ascertained by proper inquisition, was as follows:—The castle was built of stone, and surrounded a fair court, being itself encompassed by a double moat. The great dining-room was well garnished with pictures, the hall large and spacious, the lodgings were goodly; there was a convenient yard for wood, large brewhouses, and a capacious barn. On the south side the Nene formed the moat, and the inner moat was formed by the mill-brook. The demolition of the castle by James was intended to mark his indignation at the execution of his mother.

In 1787, when Mr. Nicholls visited the site, he remarked that "almost all the materials have been carried away, and even the foundations dug up, for the purposes of building, and for repairing the roads, causeways, and banks of the river. The palace was situated on the south-east side of the castle-hill, fronting the river that runs below, commanding a most beautiful prospect over the extensive meadows into the south. The porch, or entrance, except a small fragment, has been taken down within these few years. A farm-house has been built on the spot occupied by the old stables." Mr. Nicholls says that the hall where Mary was beheaded was on the first ascent, and the keep on the second. There was an excellent specimen of an old hostelry existing in 1787, which was then still used as an inn.

The village has not a population of three hundred souls. The fair and market which it once possessed have long ceased to attract sellers and buyers. A nunnery which existed here was transferred at an early period to another place. In 1411 a college was begun for a master, twelve chaplains, or fellows, eight clerks, and thirteen choristers. Henry IV., and Edward, Duke of York, who was buried at Fotheringay, were the co-founders of this institution, which was not dissolved until the reign of Edward VI. As Leland remarks of the village—"The glorie of it standeth by the paroch church of a fair buildid and collegiated." It contains an ancient stone pulpit and a fine font. If the remains of the castle had been on an extensive scale, and well preserved, the village would be more familiarly known than it is; but its celebrity and consequence are solely the reflection of past times, the monuments of which do not exist to attract the visitor to the spot.

ON PLASTER FIGURES AND CASTS.

Any invention which has a tendency to diffuse a knowledge of the fine arts, by bringing classical specimens within the reach of the great bulk of society, must always be reckoned a great step in the progress of social improvement; since such objects are calculated to refine the taste, and such refinement always operates beneficially upon the habits, of the people at large.

It is in such a light that we regard the plaster figures with which London and other populous places are so abundantly supplied by the itinerant Italians. We have given an account of the habits of this curious class of dealers, in No. 54 of the 'Penny Magazine.' Many of the specimens which the Italian venders offer for sale are accurate copies from the most classical models produced by the chisels of the first sculptors, both ancient and modern; and though the material of which they are formed is neither so durable nor capable of producing so good an effect as the pale marble of the originals, yet it is no small matter to feel assured that we have accurate copies of the distinguishing excellences which give to the originals a lasting value.

The cheapness of plaster of Paris, and the ease with which it may be reduced to a fluid state and afterwards solidified, appear to be the chief reasons why that material is so generally employed for casts. Before therefore we describe the mode of casting, we must say a few words respecting the material of which the casts are made. It receives the name of plaster of Paris because it is found in large quantities in the gypsum quarries round Paris. It consists of gypsum and lime, the former of which itself contains lime combined with sulphuric acid and water. The plaster is frequently prepared in England, by mixing two parts, by weight, of gypsum (from which the water has been driven off by heat) with one part of quicklime. The heating is effected in a brick trough, beneath which is a flue; and if it is not carried sufficiently far, the plaster is a long time in setting, or solidifying, after it has been moulded. In order to prepare the powder for casting, water is added to it, till it acquires the consistence of cream, which easily attaches itself to the interior surface of moulds, and in a few minutes becomes solid, in consequence of a chemical combination between the water, the gypsum, and the quicklime.

This, then, being the material, we proceed to the process of casting.

Perhaps the simplest species of casting is that of coins, medallions, &c. Most persons may have seen neatly-executed little medallions hawked about by the Italian image-makers for a few pence: the 'Last Supper' of Leonardo da Vinci, and similar subjects, may be had in this form. The coin, cameo, or medallion, from which plaster casts are to be taken, is brushed over with oil, to prevent the adhesion of the plaster, and a wall or raised edge of card or tin is placed round it, so that the medallion lies

in a cell or trough. The plaster is then mixed with water to the proper consistence, and poured upon the medallion, until the trough is filled. In a few minutes it becomes solidified, and the raised edge being removed, the plaster and the medallion are taken up from the slab or table on which they had been placed, and the medallion is easily separated from the plaster, which then presents an exact *mould* or counterpart of the original medallion. From this mould copies of the medallion are made in a very similar manner to that in which the mould itself was made. The mould is oiled, and liquid plaster is poured into it, which, on cooling, presents a copy of the original medallion, which may be easily removed from the plaster mould.

The simplest approach towards a bust of the human figure is a cast which represents the face only. Many of these—copies of the faces of distinguished individuals—may be seen at the figure-maker's: they are the size of life, and are produced as follows. The individual whose face is to be represented is placed upon his back, with his hair smoothed back by means of pomatum, to prevent it from covering any part of the face. A conical piece of stiff paper, or a quill, or a straw, is then inserted into each nostril, through which the act of breathing is to be performed. The eyes and mouth being now closed, the face is brushed over with a slight coating of salad oil, to prevent the adhesion of the plaster to the skin. All is now ready for the application of the plaster; which, being mixed to the proper consistence, is poured, in large spoonfuls, all over the face, till it is entirely covered to the thickness of a quarter or half an inch. In a few minutes the plaster becomes set, and is taken off in one entire piece, as if it were a film from the whole face, the hollow surface of which film is an exact mould of the face. When this mask-mould is hard, casts may be procured from it in any quantity, in the same way as from the medallion-mould before alluded to,—with this exception, that the cast of the face is rendered as nearly as possible equal in thickness in its several parts, by turning the mould into various positions, so as to allow the liquid plaster to flow from one part to another, as occasion may require.

When a cast of the entire head, or of the whole human figure, however, is required, either a cast of the face is added to a mass of clay which is to be modelled to the required figure, or the whole figure is modelled from drawings prepared for that purpose. It is here that the genius of the sculptor begins to develop itself. The mass of clay is pressed by the hand into a rough approach to the proper form, and the modeller then proceeds to produce all the minute depressions, curves, and projections necessary to give the required effect. This he does with small wooden or ivory tools, of which one end is pointed, round, square, or oblique. The clay used for this purpose is previously washed, and mixed with one-third of its bulk of fine sand. If the clay model be large, the interior is built up of a wooden frame-work, which acts as a support to the clay by which it is surrounded.

When the clay model is finished, a mould is made from it with plaster of Paris, as in the former cases. But here a difficulty occurs. If the model be entirely covered with plaster, how can it be removed from within the mould without breaking the latter? This could not be done unless the mould were made in pieces. Accordingly, if the figure be a bust, a thin edge or ridge of clay is laid along the figure from the head to the base; and the front is first completed up to this ridge of clay, by filling up all the depressions, &c., with plaster, which is first used in a liquid state, and then of a thicker consistence, until a thickness of two or three inches is obtained. The ridge of clay is now removed, the edges of the plaster are slightly oiled, and the hinder half of the model is moulded in a similar way, until the model becomes covered with a thick coating of plaster. By the application of a chisel and mallet at the seam or joining, the mould separates into its two parts, since the oil which was applied to the edges of the first-made half prevents the other half from adhering to it. The clay model is then broken out of the two halves of the mould, until the concave surface of the latter presents a clean and accurate representation of the figure. The two halves are then replaced and joined together with cords, by which a complete hollow mould of the figure is obtained.

When the figure is more complicated, having numerous curved and undulating surfaces, such as the entire human figure, it would be impossible to make the mould even in *two* pieces, for the model could not be removed from within the two halves of the mould without breaking the latter. In such cases the model, when properly prepared, oiled, &c., is covered with the plaster in every part; and when dry, the plaster is cut by lines in various directions, by means of a sharp thin knife. The directions in which these cuts are made are so chosen as to enable the caster to take the mould, piece by piece, from off the model. Great tact and judgment are necessary in this part of the business, since attention must be paid to all the depressions and hollows of the figure, and the divisions cut in such directions as to facilitate the removal of the pieces.

If but a single copy or cast from a mould is required, plaster is poured into the mould, and worked about to equalize its thickness; after which the mould is broken away, piece by piece, from the cast, leaving the latter an exact copy of the original. But when numerous casts of a figure are required for public sale, a *safe-mould*, as it is termed, is made. This mould is made in several pieces, as just described; and the pieces are put together in a temporary manner for the production of every separate cast, and taken to pieces again to remove the cast thus made from within the mould. Our readers may frequently have seen, in the shops of the plaster figure-makers, that some of the figures have ragged-looking edges or seams traversing their surfaces in various directions. These seams result from the imperfect joining of the various pieces of the mould in which the figure was cast, and are afterwards scraped or cut off.

The moulds employed for yielding plaster casts are not always made of plaster; for if an object or figure be perpendicular, it would be difficult to employ liquid plaster for such a purpose. Sometimes clay is used as the material for the mould, which is pressed into all the parts of the figure. For some purposes the mould is made of resin, bees'-wax, and pitch; and for others, a mould possessing some elasticity is obtained from a strong solution of glue.

Casts are frequently taken from ancient sculptures; on which occasion, whether the mould be made of clay or of plaster, attention must be given to two points, viz., the removal of the mould without injury to the model, and the division of the mould by cutting into such pieces as may readily be separated from the model. In some cases the limbs of a figure are cast in separate moulds, and are afterwards joined to the casts obtained from the moulds representing the head, body, &c.

Plaster figures may be exposed to the weather with impunity, if treated according to the discovery of Thénard and D'Arcet. Melt one part of yellow wax in three parts of linseed oil which had previously been boiled with one-tenth of its weight of litharge. The cast having been heated to about 200°, the composition is laid on with a brush until the plaster is saturated, by which it will become weather-proof. By mixing some of the salts of copper and iron with the wax, a permanent and excellent imitation of antique bronze is produced without imparting any roughness to the surface of the cast. The casts may have a certain resemblance to polished marble imparted to them by dipping them into a composition which consists of a quarter of an ounce of soap dissolved in a pint of water, to which a quarter of an ounce of wax is added. After drying for about a week, the cast is rubbed or polished with a piece of linen.

THE EMPIRE OF JAPAN

[Continued from No. 417.]

[Annual Embassy of the Dutch on its March.]

After the authority of the Koubo Sama, or secular emperor, was established, it became a custom for the nobility of various grades in Japan to present themselves once a year at the court in Yedo. To this custom the Dutch were required to conform; and hence originated the annual embassies made from the factory at Nagasaki to the emperor; and it is to this circumstance, as has already been mentioned, that we owe a considerable portion of our knowledge of the interior of Japan, and of the habits and character of the people. Great ceremony is observed in conducting the embassy to Yedo. The ambassador is the head of the Dutch factory; he is accompanied by the physician of the factory and secretaries, and attended by a numerous retinue of Japanese, appointed ostensibly as a guard of honour, but in reality to watch the embassy, and to prevent it having much communication with the inhabitants generally. The route from Nagasaki to Yedo has been already described. In Kæmpfer's time it occupied a period of about three months to go and return, including the stay at the capital.

Along the great roads are numerous inns and post-houses. The post-houses are placed at regular distances, and at each there is a postmaster, whose duty it is to keep registers of all travellers, to attend to the carriage of letters, government edicts, &c. The inns consist of two stories, the lowest one serving as a storehouse. Each inn has a garden attached to it. Both sexes carry fans when they go out or travel; and the ingenuity of the Japanese is exhibited in the fact, that on what may be termed travelling fans there is to be found, painted or written, the different travelling routes, lists of the inns, and other useful information; besides which, little road-books are sold by boys and others on the highways.

As we may find occasion hereafter to give some particulars illustrative of the *present* or modern state of Japan, we shall confine this article to an abridgement chiefly of Kæmpfer's account of the annual embassy, as it was performed in his time.

All princes and lords being obliged to make their appearance once a year, this was done by the Dutch about the middle of February. Having sent their presents on before, they sail for Simonoseki. Their goods are all marked with the possessor's name and what they contain. Their train on an average (varying from the escorts they pick up and drop on their visits as they proceed) may be 100. Each day's journey is long and fatiguing, from morning (saving an hour for dinner) till evening, making ten to thirteen Japanese miles a day. They have the same honour paid them as travelling native princes. The entertainment on the road is as good as could be desired; yet the narrow compass of liberty is a cause of complaint. The attendants leave you on no occasion; at your inn you cannot go beyond the *garden;* on the road, if you dismount, the cavalcade instantly stops. The Bugjo, or commander-in-chief, studies night and day the nature of his instructions and the journals of his predecessors, following *step by step* their actions and behaviour. It is looked upon as a proof of his faithfulness to *exceed* them. Nay, some of them insist, in spite of accident, on reaching the same inns at the stated times. The landlord treats them as they would princes of the empire. He comes ceremoniously out of the town or village, address-

ing all of them, bowing and complimenting them, then hastens to his house and a second time receives them. When in their apartments the landlord with his chief domestics attend, each with a dish of tea, which they present with a low bow, repeating in a deep-fetched voice, *Ah, ah, ah*, an expression of submission or inferiority. What else they want their own servants fetch. Civility in every shape is shown more than could be expected from the most polished nation. The behaviour of the Japanese, from the meanest countryman to the greatest lord, is such, that the whole empire might be called a school of civility and good manners. They have so much sense and innate curiosity, that if they were not absolutely denied free and open conversation and correspondence with foreigners, they would receive them with the utmost kindness and pleasure.

The following extract from the journal of Kæmpfer shows how populous was the country through which they passed :—

"February 10, 1691.—Mr. Von Butenheim, the Dutch ambassador to the emperor's court, took leave of the two governors of Nagasaki; packed baggage: on the 14th we left our island attended by the two governors and their whole court. It is a journey of about 200 German miles from Nagasaki to Yedo. Pass thirty-three large cities with castles, seventy-five small towns, and innumerable villages and hamlets. Our train consisted of a *Doser*, his deputy, a bailiff, then our interpreter, Dr. Kæmpfer, and his assistant, all on horseback. Last of all came the *Soriki*, or Bugjo, as chief of the train. The cooks, servants, and kitchen-furniture were sent before, as also clerks to note expenses, provide horses, take memorandums, &c."

On their arrival at the commercial city of Osaka, one of the chief seaports in Japan, they had an interview with the governor, whose conversation turned chiefly on the following points—that the weather was very cold—that we had made a very great journey—that it was a singular favour to be admitted to the emperor's presence—that of all nations the Dutch alone were allowed the honour. He then asked "whether we were not extremely delighted with the sight of their country after so long and fatiguing a journey?"

They reached Yedo after a journey of twenty-nine days from Nagasaki. Here a house was assigned to them, and all care taken of them, but they were strictly guarded, and not suffered to leave their quarters. Their time was occupied in arranging their presents, and preparing themselves for the expected audience, for which, however, they had to wait several days.

The palace, or residence of the emperor, occupies a large space nearly in the centre of the city of Yedo. The palace is more a collection of houses than one house. The houses of the Japanese are generally of one story, and the emperor's palace is not an exception. The mansions of the rich, which are numerous in Yedo, are not deficient in neatness or convenience. Most of them are built of wood. The walls of the apartments are hung with mats, fringed and embroidered, and ornamented with paintings.

On the day appointed for the first audience of the Dutch embassy the whole party was conducted with much ceremony through the exterior gates and courts of the palace to the hall of audience, called the Hall of the Hundred Mats. Here the emperor was seated cross-legged to receive them.

"Our resident," says Kæmpfer, "was received into the emperor's presence, when they all cried out *Hollande Captain*, which was the signal for him to draw near and make his obeisances. Accordingly he crawled on his hands and knees to a place shown him between the presents duly ranged on one side and the place where the emperor sat on the other, and then kneeling, he bowed his forehead quite to the ground, and so crawled backwards like a crab without uttering one single word. So mean and short a thing is the audience we have of this mighty monarch. Nor is there any difference to the greatest prince of the empire.

"Our second audience. We were conducted through lines of life-guardsmen, and shown to the imperial apartments by some great officers of the crown. *Benjo*, a chief minister, bid us welcome in the emperor's name. The mutual compliments being over, we were asked a thousand ridiculous and impertinent questions. They desired to know how old each was—his name, which we were commanded to write on a bit of paper—what distemper I thought most dangerous—how I proceeded to cure cancerous humours and imposthumations of the inner parts—the distance from Holland to Batavia—from Batavia to Nagasaki—whether European physicians did not search after medicine to render people immortal, &c. &c. The emperor, who had hitherto sat among the ladies, now drew near to us; he ordered us to take off our cloaks of ceremony, then to stand up that he might have a full view of us; again to walk—to stand still—to compliment each other—to dance—to jump—to play the drunkard—to speak broken Japanese—to read Dutch—to paint—to sing—to put our cloaks on and off. Meanwhile we obeyed the emperor's commands, and I joined to my dance a love song in High German. In this manner, with innumerable such other apish tricks, we must suffer ourselves to contribute to the emperor's and the court's diversion. The ambassador is free from this and the like commands, for as he represents the authority of his masters, such care is taken that nothing should be done to injure or prejudice the same. Besides that, he showed so much gravity in his countenance and behaviour as was sufficient to convince the Japanese that he was not at all a fit person to have such ridiculous and comical commands put upon him. Having been thus examined for two hours, though with great apparent civility, some servants then came in, and put before us a small table with Japanese victuals. We ate some little things. We were then ordered to put on our cloaks and take our leave; and without delay complied with, putting thereby an end to this second audience."

THE COPPERAS-MINE OF VERMONT.

On the declivity of the chain of hills which stretches from the north to the south of the state of Vermont, is situated the copperas-mine of Strafford. It is not far from the summit of a hill which rises from two to three hundred feet above the valley immediately adjoining. The mine is opened along the side of the hill to the length of about four hundred yards, with a breadth of something more than twenty, though traces of the ore are met with to a much greater extent.

Copperas, notwithstanding its name, contains no copper. It is a sulphate of iron, or a salt composed of sulphuric acid and iron, and it may be readily formed by dissolving fragments of iron in diluted sulphuric acid. Copperas is easily known by its green transparent appearance, but the ore of the copperas-mine is in a very different state; it is a pale brassy-looking substance, known by the name of pyrites, or, as the Cornish miners call it, mundic, and is often sold in the curiosity-shops of London mingled with masses of quartz or crystal. Small veins of pyrites are frequently found disseminated in coal; and in some qualities of coal it is found in such abundance as to create a very unpleasant smell in burning. This pyrites is a sulphuret of iron, which differs from copperas, or sulphate of iron, in being a direct combination of sulphur with iron, whereas the copperas is a combination of sulphuric acid with oxide of iron. Now, it is well known to chemists that sulphuric acid is a combination of sulphur with oxygen, and that oxide of iron is a combination of iron with oxygen, consequently that copperas must be a combination of pyrites with oxygen;

this is stated in order to afford some explanation of the change of one substance to another so much unlike it in appearance, by the simple addition of water, which is a compound of oxygen and hydrogen.

In the Vermont mine pyrites is found mingled with quartz, in very small grains, forming a hard rocky mass not much unlike granite, which is also visibly a mixed mass of different ingredients. The rock is quarried by boring and blasting, and the broken masses are exposed to the action of air and water. The pyrites is thus converted into copperas by combining with the oxygen of the air and water, and the copperas formed dissolves in the water, which is drawn off and evaporated; the copperas is of course found at the bottom of the vessel which contained the water.

For some years after the discovery of the mine these operations were performed in a very inartificial manner. The rock was heaped up in large pieces on wooden scaffolds built upon a slope, at the bottom of which large troughs were placed; the rain and air gradually decomposed the surface of the lumps, and carried off the copperas into the troughs below, from which the water was drawn from time to time, and the copperas obtained by boiling.

This was evidently a slow process; it was a considerable time before a large block of stone, of a foot perhaps in diameter, could be entirely decomposed by the action of the elements, and the same masses remained year after year upon the scaffold without very much waste. It was not long, however, before a more expeditious plan was adopted; this is carried into effect in the following manner:—the rock is broken up into small pieces about the size of the stones with which we mend our roads; these are piled in heaps, sufficiently loose to allow the air to pass through; a considerable quantity of water is then poured on and the action begins. The appearance is at first similar to that which is observed when water is poured upon a heap of quicklime; the mass grows hot, and emits much steam, but the violence of the action soon becomes greater than that which is excited in lime. In a short time the heat increases, large quantities of sulphurous gas are evolved, and frequently quantities of sulphur rise to the surface and burn there with a bright flame. The scene is described to be like that of a little volcano, which is dangerous to approach except on the windward side. A stick thrust into the mass is burned black in a few minutes; water rapidly boils, and the grass and trees to a considerable distance are destroyed by the fumes as though scorched by fire. After lasting three weeks or a month the heat subsides; the mass has become friable, and is readily reduced to fine powder, in which state it is placed in wooden cisterns, and is lixiviated much in the same way that washerwomen procure lye from wood-ashes.

The declivity of the ground affords great facility for all the subsequent operations; a wooden trough conveys the water from the lixiviating cisterns to the evaporating vessels, which are formed of lead with wooden sides; here the liquor is heated until it becomes strong enough to crystallize, when it is drawn off into cisterns in which branches of trees are spread about to serve as a base for the crystals. Any one who has seen the alum-baskets made, which were so common a few years ago, will at once understand this part of the process. Alum, copperas, and almost all soluble salts, are more soluble in hot water than in cold; that is to say, hot water dissolves a great deal more of them than cold water. Now, if a certain quantity of hot water can dissolve two pounds of alum for example, when the same quantity of cold water can dissolve only one pound, it is clear that as the hot water containing the two pounds cools, it will let go the pound which when cold it is unable to dissolve. As the hot water cools slowly, the salt will be deposited slowly, and will have time to arrange itself in regular crystalline forms, which will be found surrounding and enveloping any object placed in the water. In the copperas-works now described the branches become covered with a mass of salt, having the appearance of foliage and fruit, composed of the most beautiful green crystals, which are mostly large and perfect, presenting brilliant facets often several inches broad. Several perfect crystals have been found six inches in length.

The original slow process first described has not been totally abandoned, but is used as an auxiliary to the more improved method. A channel has been cut in the earth quite across the lower edge of the mine, into which all the washings of the mine are carried whenever a shower of rain falls. Large pieces of rock are placed on the upper margin of the channel to be slowly decomposed, as in the original manner, and in this way, from the oozings of the hill above and occasional showers, the channel becomes a rivulet of copperas-water which runs into the boilers. A considerable increase of produce is occasionally obtained without trouble by this contrivance.

Whenever a dry day follows rain the mine puts on its most brilliant dress; every part is covered with a crystalline efflorescence like hoar-frost, with a very slight tinge of green, and great numbers of dazzling stalactites are seen hanging like icicles from every portion of the roof whence water has dropped. But a continuance of dry weather converts it all to a rusty-looking powder, which is in fact rust of iron.

Where the mine has not been opened it is covered to the depth of three feet with compact incrustations of vegetables formed of oxide of iron. These incrustations are thin and hollow, the vegetable which they once covered having decayed and disappeared, but having left its mould or pattern so perfectly formed, that it is difficult for a person to convince himself the real vegetable is not there. The veins of the leaves and the lines on the bark are preserved to microscopic minuteness. All the plants found are recognised as growing in the neighbourhood, or in similar spots in the same range of country.

All the operations of this mine are so simple, and so much is done spontaneously, that a great deal of work is carried on by a few hands. The labour of four men is sufficient for the production of one hundred tons of copperas in a year; and leisure is afforded them in the intervals of work to manage entirely the business of a small farm in the neighbourhood.

ON MUSICAL SNUFF-BOXES.

Musical instruments may be divided into two classes, which are separated from each other by a very marked and distinctive character: that is, whether the tunes capable of being played upon them be limited or unlimited in their number. The generality of instruments belong to the latter class: the pianoforte, harp, flute, violin, &c., have no other limit to the number of tunes which may be played upon them, than that which is due to the skill of the performer. To the former class belong musical snuff-boxes, musical clocks and watches, barrel-organs, and a great variety of instruments which, under the names of Apollonicon, Euterpeon, &c., act on principles somewhat analogous to those of the barrel-organ. Of the Apollonicon we may remark that it belongs to both classes, since the range of tunes played by its self-acting powers is limited and defined; but when the keys are played upon by Mr. Purkis, the range of tunes is as unlimited as if it were a pianoforte.

The musical snuff-box, which is comparatively speaking of modern invention, is universally admired for the liquid sweetness of its tones, the great range of notes embraced by it, and the rich harmonies resulting from the sounding of several notes simultaneously. But the principle on which this little instrument acts is not very generally known. That little pins which project from a

revolving barrel jut against metallic springs, and, by causing them to vibrate, elicit musical sounds, is readily observable; but how those sounds can be so chosen as to form an exquisite harmonized air by their combination, is not so easily understood. We will devote a short space to this subject.

Metallic springs, when fixed at one end and free to vibrate at the other, will yield notes which vary in pitch according to the dimensions of the spring. If two springs be of equal width and thickness, the shorter of the two will yield the higher note: if the length of the two be equal, but their thickness be different, the thicker of the two will yield the higher note. By a judicious management therefore of the length, thickness, and width of a series of springs, several octaves may be produced, of which all the semitones may be accurately filled up. Such is the case in a musical snuff-box. On inspecting it we shall find a series of small metallic springs ranged side by side in the order of their pitch, the lowest being at one end, and the most acute at the other. By filing these springs, or by loading them with small pieces of metal attached to their under surfaces, as the case may be, the whole series is accurately attuned, and the means must now be devised for setting them into a state of vibration.

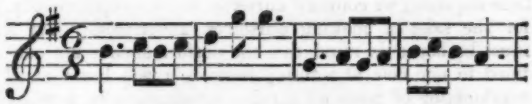
This is effected by means of small pins which are fixed on the surface of a revolving barrel. The barrel is placed lengthwise opposite to the ends of the springs, but at a small distance from them, so that if projections were not inserted in the barrel, the springs would remain untouched. These projecting pins stand out from the barrel just far enough to catch against the springs—set them into vibration—and then liberate them again. It might be supposed that directly the disturbing force is removed, the vibrations of the springs and the sounds resulting from these vibrations would cease. But all vibrating bodies make a number of vibrations after the moving force is removed: the pendulum of a clock, the chandelier suspended from a ceiling, &c., are instances of this. But the rapidity of these vibrations during the production of a musical note is so great as almost to exceed belief, were it not attested by well conducted experiments. For instance, the note which is called tenor C, which is the middle C of the pianoforte, is due to a velocity of vibration of 256 in a second; that is, when a metallic spring, or the wire of a pianoforte, or any other musical instrument, is producing the tenor C, it is vibrating 256 times in a second; and as the pitch of the note becomes more elevated, so does the rapidity of the vibrations increase. It is no wonder, therefore, that we cannot *see* the vibrations of the springs of a musical snuff-box.

The revolving motion of the barrel is effected by similar contrivances to those which produce the motion of the wheels of a watch. A steel spring is coiled up by means of a key which is applied to it; and as its elastic tension causes it to unwind, it sets in motion a ratchet wheel, which acts upon another wheel attached to the barrel, by which the latter is made to revolve so long as the coiled spring is unwinding itself. The motion of the barrel, then, is wholly due to mechanical arrangements similar to those of a watch.

Having now got the vibrating springs and the revolving barrel, it remains to describe how the pins are arranged on the surface of the barrel so as to touch those springs, and those only, necessary to produce a given tune.

During the revolution of the barrel, every part of its surface comes, in succession, opposite the ends of the springs, so that if a ring or circle of pins were inserted in the surface of the barrel at any given part of its length, they would all in succession touch one spring, *and one spring only*. Consequently, if there be as many such circles of pins as there are springs, and the circles be placed at the same distance from one another as are the springs, every spring will have a ring or circle of pins appropriated to itself. If the pins be arranged symmetrically throughout the whole barrel, that is, if the circles be not only all studded with pins, but studded in precisely the same manner, all the springs would, when the barrel was revolving, be touched at the same moment,—then would be a moment of silence while the barrel moved round a small distance,—and then another contact of pins against the whole range of springs. This would obviously produce nothing more than a crash of discordant notes, sharps, flats, and naturals all mingled together in inharmonious confusion, and no semblance of a tune would be heard. The maker has therefore to fill up the circles of pins so that the pins of different circles shall act in succession and not together.

Suppose that the maker had chosen Mozart's charming air 'Life let us cherish,' and wished to arrange it on the barrel in the key of G. The first four bars are as follow:—



The first note is a dotted crotchet on the note B. He therefore places a pin in that circle which is opposite to the spring yielding the note B; this we will call the circle B. The next note is C, but as the first note is a dotted crotchet (equal in duration to three quavers), the second pin must be so placed that the barrel shall revolve a short distance between the contact of the first and the second pins with their respective springs; by which means a proper time will elapse between the sound of the B and of the following C. The next note is D, and another pin is inserted in the circle B; but as the preceding note, C, has only the duration of a quaver, the interval between the second and third notes must be only one-third as long as between the first and second notes; such a position is therefore chosen in the circle D, that that note shall be sounded very quickly after the preceding C. The fourth note is another C, which, on account of the preceding B being also a quaver, is pinned so as to sound after the same length of interval as in the last case. Thus does he proceed; moving along the barrel to produce difference of *pitch*, and round the barrel to produce difference of *time*, in the notes produced. In the above four bars the B occurs four times: between the striking of the first and second, there is an interval equal to four quavers; between the second and third, fourteen quavers; and between the third and fourth, two quavers: if therefore we were to examine the circle of pins which strike the spring B, we should find those four pins at the relative distances of 4, 14, and 2, from one another. By a similar examination we could find the relative distances of the pins in all the repetitions of the notes G, A, C, and D, in the above example; but what we have already said will be sufficient.

The rapidity of the motion of the barrel and the distances of the pins upon its surface are so regulated that a tune is played exactly through, either once or twice, during one complete revolution of the barrel; else, were not this the case, the pins necessary to produce the final notes of a tune would interfere with those necessary for its commencement.

It is generally known that the greater number of musical snuff-boxes play two tunes each. Now a little consideration will show that, without some ingenious management, either the two tunes would be playing together, and would mutually spoil each other, or if each one occupied exactly half of the barrel, they would invariably alternate one with another, and we could never obtain the same tune twice in succession. To obviate this, the series of circles of pins belonging to one tune are interposed between those belonging to the other; that is, the B circle of one is a little on one side of the

a circle of the other; and so on with other notes. Now in order that one series of pins may remain inactive while the other series is striking the requisite springs, the ends of the springs are brought up very narrow, so as to leave a space between every pair of contiguous springs. When then the pins of one tune are striking against the springs, the pins of the other pass *between* the springs without touching them. By this means one set is wholly inactive, while the other is producing the tune. When a change from one tune to the other is desired, the barrel is, by means of a little mechanism (which is moved by a stud on the outside of the box), shifted a little onwards, in the direction of its length, and to such a distance that those pins which before acted on the springs now pass between them, while those which were before inactive assume a position in which they can strike the springs.

In giving a musical example of the manner in which the pins are distributed round the barrel according to the tune required, we confined ourselves to the simple melody, for the sake of making ourselves understood. But it must be borne in mind that the performance is not confined to one note at a time; there is a rich harmonized combination of notes all playing simultaneously, forming tenor and base in all their variety and beauty. The person who fixes the pins must therefore either be a musician of some skill, or must be furnished with a copy of a sheet of music properly arranged.

Whatever tunes the maker fixes upon will be the only ones capable of being played on the instrument, unless the whole of the pins are taken out, and re-arranged in accordance with another tune. Some boxes of a larger size have the power of playing as many as six different tunes: in these of course the mechanism is larger in all its proportions, and more carefully fitted.

Our purpose has here been to explain, in a musical point of view, the action of these very delightful little instruments; and not to detail the mere mechanical construction by which the coiled spring acts upon wheels and those wheels upon the barrel: an inspection of a common watch will give a sufficient insight into these particulars. The great manufactory for these articles, and for timekeepers of various kinds, is Geneva and some parts of France, from whence they are brought over in boxes variously ornamented according to the means of the purchaser. The horn covering is intended to protect the delicate interior mechanism from dust and other injuries.

We may shortly allude, in conclusion, to the augmentation of sound produced by holding a musical box, while playing, against a door or similar flat surface. The case which contains the works is set into a vibratory state by them, and, in its turn, communicates similar vibrations to a door against which it is held; and the intensity of the sound is increased because the air in the room is agitated by the vibration of a large door instead of by that of a small box only.

Previous State of the Law with respect to Registration.—After the Revolution, and in the reign of William III., several acts were passed to enforce, not a registry of baptisms, but of births, and also of marriages and burials, as a source of revenue to the state; for by the act 6 and 7 Will. III., c. 6 (1694), granting his Majesty certain rates and duties on marriages, *births*, and burials, the clergy were compelled, under penalty of 100*l.* for neglect, to take an exact and true account, and keep a register of all persons married, buried, christened, or born in their respective parishes, and the collectors and all persons concerned were to have free access to them without fee or reward. Under this act it will be perceived that the clergy were compelled to act gratuitously as civil officers, and to collect information of the births of all children born within their parishes, to whatever religious denomination the parent might belong, and quite irrespective of any baptismal right performed by them, or by any minister dissenting from their church. This duty having been found too onerous, and information as to births being unattainable by clergymen since the parents by concealment eluded payment of the tax, the act 7 and 8 Will. III., c. 35 (1695), provided that the parents of every child should, within five days after birth, give notice to the clergyman of the day of the birth of such child, under a penalty of 40*s.*; and the clergyman should, under a like penalty, take an account of and keep a distinct register of every child born and not christened, for doing which the parents were to pay 6*d.* to him. Ultimately this tax was discontinued; but in 1783 (23 Geo. III., c. 67) a stamp-duty of 3*d.* was imposed on every entry of burials, marriages, births, or christenings, to be demanded by each clergyman from the undertaker, or parties married, or the parents of a child whose birth or christening was registered; and by the 25 Geo. III. c. 75, the act was extended to Dissenting ministers, whose registrations of births, or baptisms, or burials, were so recognised by law. In 1794, however, this act was also repealed, and at present (1833) the parochial registries for baptisms and burials are regulated by the act 52 Geo. III., c. 146, passed in 1812. On this extraordinary statute the whole system of parochial registration at present depends: and that it is extraordinary will appear, if reference be made to the title, which includes a register of births, for which no provision was framed, and which cannot legally be kept; to the clauses directing the labours of receiving, and arranging, and indexing all the copies of registers, and making reports to the bishops by the diocesan registrars, for which no compensation is awarded; and to the clause for appropriating penalties, which are not imposed, and of which the only one directed is transportation. Connected with the Statute Law are cases which should not be unknown. Those cases have decided—1st. That entries of births made by clergymen on the representation of parents in registers of baptisms are not evidence of birth, and that, as evidence, the entries cannot be read. 2nd. That entries in register-books occasionally made up from memoranda, and from day or rough books, used in many parishes, cannot be received in evidence.—*Report of Select Committee of the House of Commons on Parochial Registration:* 1833.

Management of Bees on Mount Hymettus, in Greece. By G. Wheeler, Esq.—The hives in which they keep their bees are made of willow or osiers, fastened like our common dust baskets, wide at the tops, and narrow at the bottom, or plastered with clay or loam within and without. They are set the wide end upwards. The tops, being covered with broad flat sticks, are also covered with clay at the top; and, to secure them from the weather, they cover them with a tuft of straw, as we do. Along each of these sticks the bees fasten their combs, so that a comb may be taken out whole, without the least bruising, and with the greatest ease imaginable. To increase them, in spring time, that is, in March or April until the beginning of May, they divide them, just separating the sticks, on which the combs and bees are fastened, from one another with a knife; so taking out the first comb and bees together on each side, they put them into another basket in the same order as they were taken out, until they have equally divided them. After this, when they were both again accommodated with sticks and plaster, they set in the new basket in the place of the old one, and the old one in some new place. And all this they do in the middle of the day, at such a time as the greatest part of the bees are abroad, who, at their coming home, without much difficulty, by this means divide themselves equally. This device hinders them from swarming and fly ing away. In August they take out their honey, which they do in the daytime also, while they are abroad; the bees being thereby, they say, disturbed least; at which time they take out the combs laden with honey as before, that is, beginning at each outside, and so taking away until they have left out such a quantity of combs in the middle as they judge will be sufficient to maintain the bees in winter; sweeping those bees that are on the combs they take out into the basket again, and again covering it with new sticks and plaster. It has been doubted whether, in England, the like quantity of honey may be taken without endangering a scarcity in winter, the bees probably not collecting so much. Let less, therefore, be taken away. By these means, it has been said, the great increase and multiplying of the stock would soon equalize and far exceed the little profit we make by destroying them.

LONDON:—CHARLES KNIGHT & CO., 22, LUDGATE STREET
Printed by William Clowes and Sons, Stamford Street.